

REMARKS

This is in response to the Office Action dated December 8, 2009. Claims 1, 3, and 4 are pending in the application. Claim 1 is amended to specify that copolyester (A) in Applicants' invention has a glass transition temperature of 25 to 90°C, based upon such disclosure as that in lines 5-7 on page 13 of the specification. No new matter is introduced by this Amendment.

Prior art rejections

Claims 1, 3, and 4 were rejected under 35 U.S.C. § 102(b) as being anticipated by JP 2001-055497 (Tan). Office Action, pages 2-3. Claims 1, 3, and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tan. Office Action, pages 2-3. Claims 1, 3, and 4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Tan in view of WO 98/10932 (Shiiki). Office Action, pages 4-5. Each of these grounds of rejection is respectfully traversed.

It is believed that the rejection is based upon a machine translation of Tan, which machine translation does not correctly translate significant portions of the disclosure in JP 2001-055497. A correct partial translation of JP 2001-055497 is enclosed herewith.

Referring to paragraph [0015] in Tan, the Examiner contends that Tan discloses "15 to 50 parts by weight of an amorphous polyester (C) comprising 10 to 85 mol% of constitutional units chosen from a group including glycolic acid." However, this disclosure does not appear in Tan. Instead, as can be seen from the correct translations of paragraphs [0015] and [0052] enclosed herewith, amorphous polyester (C) in Tan contains a structural unit selected from a group including glycolic acid in an amount of not less than 85 mol% based on 100 mol% of all structural units, and polyester (C) has at least three kinds of structural units each contained in an amount of not less than 10 mol%.

Referring to paragraph [0115] in Tan, the Examiner contends that in Tan, "Example 14 specifically includes dimethyl terephthalate, glycolic acid and ethylene glycol." The rejection appears to be premised on the assumption that glycolic acid copolymerized with polyethylene terephthalate (B3) in Example 14 of Tan, in which the content of glycolic acid is 7.5 mol%,

corresponds to the presently claimed polyester resin composition in which the hydroxy carboxylic acid units of 5 or less carbon atoms are contained in amounts of 2 to 75% by mol based on 100% by mol of all the constituent units contained in the composition. However, this is incorrect.

The composition of the present invention is obtained by melt mixing (A) a copolyester comprising 60 to 98 mol% of a hydroxy carboxylic acid unit and (B) a crystalline polyester. The polyester (B3) in Example 14 of Tan is not amorphous polyester (C) of Tan. The machine translation of Tan Example 14 refers to "glucohol acid diethyl." This should read: "ethyl glycolate." Also, the sentence fragment "the vacuum pump was operated, decompression to a temperature fall and 1 Torr was performed to 280 ** over 1 hour" in paragraph [0116] of the machine translation of Tan should read: "a vacuum pump was operated and the temperature was decreased to 280°C over 1 hour and the pressure was decreased to 1 Torr."

With the foregoing correct translation of the Tan reference in mind, Applicants compare the presently claimed compositions to the compositions taught by Tan. Tan polyester resin composition (A) comprises 40-90 parts by weight of a crystalline polyester (B) which may be polyethylene terephthalate, polytrimethylene terephthalate, polybutylene terephthalate, or polyethylene-2,6-naphthalate and 60-10 parts by weight of a polyester (C) containing a structural unit selected from phthalic acid, isophthalic acid, succinic acid, glutaric acid, adipic acid, glycolic acid, diglycolic acid, lactic acid, ethylene glycol, trimethylene glycol, 1,4-butanediol, and 1,6 hexanediol in an amount of not less than 85 mol% based on 100 mol% of all structural units, and having at least three kinds of structural units each contained in an amount of not less than 10 mol% and having a Tg (i.e., glass transition temperature) measured by DSC of not more than 20°C. See, e.g., paragraph [0015] in Tan. In Example 14 in Tan, dimethyl terephthalate, ethyl glycolate, ethylene glycol and manganese acetate 2 hydrate were transesterified and the reactant was polycondensed to produce glycolic acid polymerized polyethylene terephthalate ester (B3), which was a crystalline polyester. The amorphous polyester (C2) and the crystalline polyester (B3) were melt-mixed.

The presently claimed polyester resin compositions differ from the compositions disclosed in Tan not only structurally as can be seen from the above discussion but also by

having higher glass transition temperatures than do the Tan compositions. Glass transition temperatures are an indication of the crystallinity of polymers. Persons skilled in the art know that the crystallinity of a polymer depends upon such factors as regularity and branching in the structure of the polymer. Therefore, the difference in glass transition temperatures, and crystallinities, between Applicants' polymers and those disclosed by Tan are indicative of significant differences in the structures of the respective compositions.

Yet another differentiation between Applicants' compositions and those of Tan is the requirement that the presently claimed compositions satisfy the following formula:

$$0.03 < S_{AA}/S_{BB} < 30$$

wherein S_{AA} is a molar ratio of hydroxy carboxylic acid units, both of whose neighboring units are hydroxy carboxylic acid units, to all the hydroxy carboxylic acid units contained in the composition, and S_{BB} is a molar ratio of hydroxy carboxylic acid units, neither of whose neighboring units is a hydroxy carboxylic acid unit, to all the hydroxy carboxylic acid units contained in the composition.

The Shiiki disclosure does not remedy the deficiencies of the Tan disclosure.

Shiiki discloses polyester articles with a gas barrier resin layer comprising a polyglycolic acid containing at least 60 weight-% of a glycolic acid repeating unit. Shiiki teaches that the polyglycolic acid copolymer may also be a polymer obtained by subjecting the polyglycolic acid and another polymer having repeating units selected from formulas (2) to (5) to transesterification under heat conditions. Column 7, lines 50-54. However, Shiiki teaches that if the proportion of the repeating units exceeds 40 weight-%, the gas barrier properties inherent in the polyglycolic acid are impaired, and the toughness and heat resistance of the resulting resin layer may be deteriorated. Column 6, lines 47-51.

Therefore, Applicants' composition, which is obtained by mixing (A) in an amount of 1 to 50 parts by weight with (B) a crystalline polymer different from component (A) in an amount of 99 to 50 parts by weight, is not obvious based upon the Shiiki disclosure.

Shiiki is also silent as to the relationship S_{AA}/S_{BB} as that relationship is specified in Applicants' claims. Melt-mixing a polyester resin composition does not constitute mere mixing. Instead, it involves an ester exchange reaction. As described in Applicants' specification, the value S_{AA}/S_{BB} is an indication of a proportion of blocks of continuously bonded hydroxy carboxylic acid units to isolated hydroxyl carboxylic acid units. The claimed S_{AA}/S_{BB} parameter is not satisfied when the ester exchange reaction arising from melt-mixing is insufficient or when the ester exchange reaction progresses too far.

Applicants' invention provides a resin composition which has good gas barrier properties and which has an excellent balance between mechanical properties, heat resistance, transparency, and coloration. This is accomplished by controlling the S_{AA}/S_{BB} ratio of the composition so as to be within the specified range of copolyester (A) having the specified Tg values. This inventive concept of controlling S_{AA}/S_{BB} so as to be within a specific range is neither taught nor suggested by Tan alone or in combination with Shiiki.

The presently claimed invention considered as a whole is, therefore, not obvious from the disclosure of the references applied. Withdrawal of the rejections based upon the Tan reference (alone or in view of Shiiki) is in order and is earnestly solicited.

Contact information

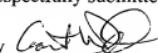
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher, Reg. No. 28,781, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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